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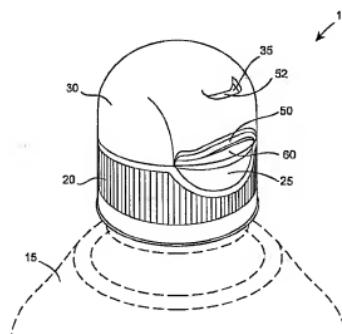


Fig. 2

(57) Abstract: Tamper-evident closures are known in which the tamper-evidence remains attached to the closures after initial opening. However, the tamper-evidence is not always that clear and therefore it is desirable to produce a closure which more clearly shows it has been initially opened. This may be achieved by having a tamper-evident closure (10) comprising a base (20), a lid (30), and a tamper-evident member (40) irreversibly moveable between a first position in which part of the member (40) is visible prior to initial opening of the closure (10) and a second position in which the said part is masked by the lid (30) so as to be partly hidden from view, the tamper-evident member (40) being moved from the first position to the second position upon initial opening of the closure (10).

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TAMPER EVIDENT CLOSURE

The present invention relates generally to a closure for a container and particularly to a closure which can provide some indication that the closure has been opened at 5 least once.

It is known to provide container closures with tamper-evident drop bands which are released from the open end of a closure side wall upon first opening. Although drop bands provide some indication that the closure has been opened, because they 10 are physically separated there is no clear indication of opening on the remaining part of the closure. It is also known to provide tear-off bands which are removed from a closure body upon first opening. However, the tear-off bands present a litter problem and a potential choking hazard because they are generally small tabs which are separated from the closure body.

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The present invention seeks to address the problems with known tamper-evident closures.

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In a first aspect, the invention provides a tamper-evident closure comprising a base, a lid and a tamper-evident member irreversibly movable between a first position in which part of the member is visible prior to initial opening of the closure and a second position in which the said part is masked by the lid so as to be at least partly hidden from view, the tamper-evident member being moved from the first position to the second position upon initial opening of the closure.

The closure may include a hinge for allowing the lid to move with respect to the base between an open position and a closed position.

5 The base and lid may be integrally hinged to one another in that they are manufactured as one piece. For instance, the closure may be manufactured from plastics and the base and lid may be moulded in one, connected together via the hinge. The hinge may be a snap type hinge and may include at least one strap.

10 The closure may include first retaining means for retaining the tamper-evident member in the first position. The first retaining means may comprise at least one frangible bridge connecting the tamper-evident member to the base and/or lid.

15 The closure may include second retaining means for retaining the tamper-evident member in the second position. The second retaining means may comprise a first projection on the lid and a first recess in the tamper-evident member. Alternatively, the second retaining means may comprise a first projection on the tamper-evident member and a first recess in the lid.

20 The closure may further include third retaining means for retaining the lid in an initially closed position. The third retaining means may comprise a second projection on the lid and a second recess in the tamper-evident member. Alternatively, the third retaining means may comprise a second projection on the tamper-evident member and a second recess in the lid.

In one embodiment, the first and second projections described above may be one and the same.

The tamper-evident member may include a grasping portion for aiding the 5 movement of the tamper-evident member from the first position to the second position. This grasping portion may project radially outwards from the perimeter of the lid such that it is easily grasped by a user.

A dispensing member may be included in the closure. This dispensing member 10 may be substantially hidden from view by the tamper-evident member with the tamper-evident member in the first position. At least part of the dispensing member may be revealed with the tamper-evident member in the second position.

The dispensing member may be a spout. The dispensing member may be a 15 different colour and/or texture from the lid and/or base to allow it to be more easily differentiated from the lid and/or base.

In use, a user may grasp the grasping portion and move the tamper-evident member from the first position to the second position thus breaking the frangible 20 bridge connecting the tamper-evident member to the base. In one embodiment, the user may grasp the grasping portion and lift or push it upwardly away from the base in an attempt to open the lid in a manner which is common to typical flip-top closures. The act of lifting or applying force to the grasping portion may move it from the first position to the second position. Continued application of this force

may then rotate the lid about the hinge such that it opens the closure. When the closure is returned to its closed position, by movement of the lid from its open position to its closed position adjacent to the base, the tamper-evident member may remain in the second position thus providing evidence that the closure has been initially opened. This evidence is enhanced by the grasping portion projecting from the lid having been moved from its initial position to its subsequent position. Further, enhancement may be provided by the revealing of at least a part of the dispensing member which is initially masked by the tamper-evident member. If the dispensing member is a different colour from the lid and/or base then it may be more clearly evident to a user that the closure has been initially opened at least once and then re-closed.

The dispensing member may be a separate member from the lid and/or base. For instance, it may be moulded separately, as opposed to being integral with the lid and/or base. The dispensing member may then be assembled with the lid and/or base. The dispensing member may be a spout for drinking from directly or for pouring from. Alternatively, the dispensing member may be integral with the lid or base.

The tamper-evident member may initially be in an unprimed state on moulding and with the lid in the as-moulded open position. Following initial closing of the lid the tamper evident member may then have a primed state in that the second projection and recess are interengaged.

The closure may include further tamper-evidence means in the form of a ring provided at the lower end of the base. This ring may fit over a neck finish of an associated container so that the base and lid combination may not be unscrewed, or otherwise removed, from the container without breaking the connection between 5 this ring and the base. The ring may be connected to the base of the closure by the means of frangible bridges as is well known in this technical field.

In one embodiment, the lid, base and hinge are moulded unitarily.

10 In another embodiment, the lid includes an aperture through which the tamper-evident member is visible with the tamper-evident member in the second position. It is possible that the tamper-evident member is not visible through the lid aperture with the tamper-evident member in the first position.

15 The lid aperture may be provided in the top of the lid.

In another aspect, the invention provides a tamper-evident closure comprising a base, a lid and a tamper-evident member irreversibly moveable between a first position in which part of the member is masked by the lid prior to initial opening 20 of the closure and a second position in which the said part is visible via an opening in the lid, the tamper-evident member being moved from the first position to the second position upon initial opening of the closure.

The various embodiments and features discussed above with regard to the first aspect of the invention may also apply to the second aspect of the invention.

5 The closure may be formed from any suitable material, such as plastics or metallic material. Different components of the closure may be formed from different materials.

10 The present invention will now be more particularly described, by way of example, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a closure formed according to a first embodiment of the present invention shown in an open state;

Figure 2 is a perspective view of the closure of Figure 1 having been opened and re-closed;

15 Figure 3 is a perspective view of the closure of Figures 1 and 2 shown in the open position;

Figure 4 is an elevational cross-section of part of the closure of Figure 1; and

Figure 5 is an elevational cross-section of part of the closure of Figure 2.

20 With regard to the use of the relative terms such as "upper" and "lower" throughout this description/specification, these relate to the orientation of the closures shown in the Figures and are not to be interpreted in any way to limit the invention. In the Figures, a closure is shown in association with a container

whereby in typical usage the closure is located at the top of the container. The term "axial" relates to an imaginary axis passing vertically, with respect to the Figures, through the dispensing orifice of the closure, and the term "radial" correspond to this axis.

5

Referring first to Figure 1 there is shown a tamper-evident closure generally indicated 10. The closure 10 is shown attached to the neck of a container 15. The closure 10 comprises a base 20 and a lid 30 which together comprise a closure body. The lid 30 is connected to the base 20 by a hinge 100 (refer to Figure 3).

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The base 20 comprises a cylindrical skirt which is open at both ends. At the end of the skirt adjacent the lid 30 a flange, or deck 22 (refer to Figure 3) extends radially inward.

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The lid 30 comprises an upturned cup-shape body having a top plate 32 and a side skirt depending from the periphery of the top plate. The skirt of the lid 30 is coaxial and concentric with the skirt of the base 20 such that in the closed position the side walls of the base 20 and the lid 30 are contiguous.

20

The base 20 is provided with a recess 25 which is located on the other side of the circumference of the base 20 from the hinge 100.

The closure 10 includes a tamper-evident member 40 which is located within the lid 30. This tamper-evident member 40 includes a grasping portion 50 which

projects radially outward from the perimeter of the lid 30 and above the recess 25 provided in the skirt 20. The grasping portion 50 is more readily gripped by a user due to the proximity of the recess 25 in the base 20 which reduces the diameter of the closure at this point underneath the grasping portion 50.

5

The lid 30 also includes an aperture or opening 35 which is provided axially above the grasping portion 50 and on a shoulder of the lid 30 between the top plate 32 and the base 20.

- 10 10 In use, a user may grasp the grasping portion 50 and push it axially upwards and away from the base 20 in order to open the lid 30 in a manner typically associated with flip-top lids. By the application of force on the grasping portion 50, the tamper-evident member 40 is moved upwardly inside the lid 30 as shown in Figure 2. With the tamper-evident member 40 moved upwardly within the lid 30 a 15 portion 60 of the dispensing member 80 (refer to Figure 3) is visible through an opening 110 (refer to Figure 5) which was previously masked by the tamper-evident member 40.

- 20 A portion 52 of the tamper-evident member 40 is also visible through the lid aperture 35 in the lid 30 once the tamper-evident member 40 has moved upwardly inside the lid 30.

Figure 2 shows the closure 10 after having been initially opened and then re-closed. Due to the structure which will be described below the tamper-evident

member 40 is irreversibly locked in the upper second position, as shown in Figure 2, which provides evidence of the closure having been opened at least once. Accordingly, evidence of tampering or having been opened and re-closed is thus provided. If the dispensing member has a different colour from the lid and/or base 5 then it is more clearly apparent to a user that the closure has been initially opened and re-closed since the portion 60 of the dispensing member 80 is more clearly visible through the opening 110.

With reference to Figure 3, the lid 30 of the closure 10 is shown in the fully open 10 position having been rotated about the hinge 100. A dispensing member 80 is shown exposed provided in association with the base 20. The dispensing member 80 includes a spout having an orifice 90. The dispensing member 80 is sealed by interaction with a bore seal 33 provided on the underside of the lid 30. This bore seal 33 takes the form of a substantially cylindrical projection which fits around 15 the spout 90 and seals against the dispensing member 80. The tamper-evident member 40 is not visible in this Figure, however, the grasping portion 50 is shown in the second or raised position. Frangible bridges 51 (refer to Figure 4) have broken on movement of the tamper-evident member 40 to the second position. The remains 41 of the frangible bridges 51 are visible on the deck 22 of the base 20 20 in the region of the recess 25.

Referring now to Figure 4, there is shown a partial cross-section of the closure 10 through the area surrounding and including the tamper-evident member 40. Figure 4 shows the tamper-evident member 40 in the first or lower position, relative to the

lid 30 and the base 20. The grasping portion 50 is spaced from the lid 30 such that an opening 105 provides a "window" or aperture through which the tamper-evident member 40 is visible. The dispensing member 80 and in particular a portion 60 of the dispensing member 80 is not visible through the aperture 105 since the tamper-evident member 40 masks it. The tamper-evident member 40 is connected to the base via at least one frangible bridge 51. The tamper-evident member 40 comprises two recesses 53, 55 provided one axially above the other and above the grasping member 50. The top 52 of the tamper-evident member 40 is axially displaced downwardly from the lid aperture 35 and accordingly is not visible through this lid aperture 35 with the tamper-evident member 40 in this first lower position.

The bore seal 33 provided within the lid 30 is shown pressed against the dispensing member 82 to thereby seal it.

Further, a retaining member 37 is indicated lying radially between the bore seal 33 and the outer skirt of the lid 30. This retaining member 37 projects downwardly from the underside of the lid 30 but does not reach all the way to the deck 22 of the skirt 20 such that it leaves an aperture 110 (refer to Figure 5). This aperture 110 is presently masked by the presence of the tamper-evident member 40 and the grasping portion 50 thereof.

Provided on the radially outer surface of this retaining member 37 is a projection 38. This projection has a sloping lower surface and a horizontal upper surface.

The sloping lower surface 38 allows the tamper evident member 40, and in particular the block 54, to travel past it from a lower, primed, position to an upper position. With the tamper-evident member 40 in the first position, as shown in Figure 4, the projection 38 projects radially outwardly and in to the recess 53 on the tamper-evident member 40. The interaction of the upper surface of the projection 38 and the top of the recess 53 prevents the lid 30 from being opened without the frangible bridge(s) 51 breaking and the tamper-evident member 40 moving upwardly with the lid 30.

10 In one embodiment, the closure 10 is moulded in the open position, as shown in Figure 3. This means that upon initial assembly the lid 30 is moved to the initially closed position as shown in Figure 1. Accordingly, the tamper-evident member 40 slides upwardly between the retaining member 37 and the outer skirt of the lid 30 so that the projection 38 on the retaining member 37 passes into the recess 53 such

15 that the tamper-evident member 40 becomes primed.

In use, a user grasps the grasping portion 50 aided by the recess 25 and applies upward axial force to it in an attempt to open the lid 30. By the application of this force, the tamper-evident 40 is moved axially upward within the pocket formed between the retaining member 37 and the outer skirt of the lid 30. This is shown in Figure 5.

In Figure 5 the tamper-evident member 40 is shown having moved axially upwards from its first position to its second position such that the projection 38 has moved

from recess 53 to recess 55 past intermediate block 54. The tamper-evident member 40 is prevented from returning to its first position by the block 54 which cannot pass back beyond the projection 38 due to the corresponding horizontal surfaces provided on the upper surface of the projection 38 and the underside of 5 the block 54. The projection 38 now rests in the lower recess 55. The frangible bridge 51 accordingly has broken leaving behind a mark or portion of the frangible bridge 41 on the deck 22 of the base 20.

By the movement of the tamper-evident member 40 to its second raised or upper 10 position an aperture 110 is exposed between the lower end of the retaining member 37 and the deck 22 of the base 20. A user may see a portion 60 of the dispensing member 80 through this aperture 110.

Furthermore the top 52 of the tamper-evident member 40 has moved axially 15 upwards and towards the lid aperture 35 provided in the lid 30 such that it is at least partially visible through this lid aperture 35.

Claims

1. A tamper-evident closure comprising a base, a lid and a tamper-evident member irreversibly movable between a first position in which part of the member is visible prior to initial opening of the closure and a second position in which the said part is masked by the lid so as to be at least partly hidden from view, the tamper-evident member being moved from the first position to the second position upon initial opening of the closure.
- 10 2. A closure according to claim 1, further including first retaining means for retaining the tamper-evident member in the first position.
- 15 3. A closure according to claim 2, wherein the first retaining means comprises at least one frangible bridge connecting the tamper-evident member to the base and/or lid.
- 20 4. A closure according to any preceding claim, further including second retaining means for retaining the tamper-evident member in the second position.
5. A closure according to claim 4, wherein the second retaining means comprises a first projection on the lid and a first recess in the tamper-evident member.
- 25 6. A closure according to any preceding claim, further including third retaining means for retaining the lid in an initially closed position.

7. A closure according to claim 6, wherein the third retaining means comprises a second projection on the lid and a second recess in the tamper-evident member.

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8. A closure according to claim 7, when indirectly dependent on claim 5, wherein the first and second projections are the same.

9. A closure according to any preceding claim, wherein the tamper-evident member includes a grasping portion for aiding the movement of the tamper-evident member from the first position to the second position.

10. A closure according to claim 9, wherein the grasping portion projects radially outwards from the perimeter of the lid.

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11. A closure according to any preceding claim, further including a dispensing member substantially hidden from view by the tamper-evident member with the tamper-evident member in the first position, wherein at least part of the dispensing member is revealed with the tamper-evident member in the second position.

12. A closure according to claim 11, wherein the dispensing member is a spout.

13. A closure according to either of claims 11 and 12, wherein the dispensing member is a different colour from the lid and base.

14. A closure according to any preceding claim, further including a hinge 5 for allowing the lid to move with respect to the base between an open position and a closed position.

15. A closure according to claim 14, wherein the lid, base and hinge are moulded unitarily.

10

16. A closure according to any preceding claim, wherein the lid includes an aperture through which the tamper-evident member is visible with the tamper-evident member in the second position.

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17. A closure according to claim 16, wherein the aperture is provided in the top of the lid.

18. A tamper-evident closure substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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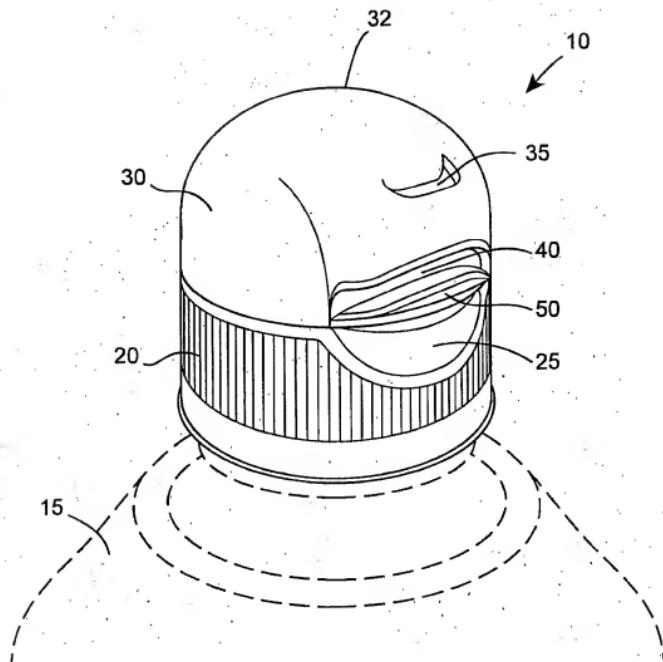


Fig. 1

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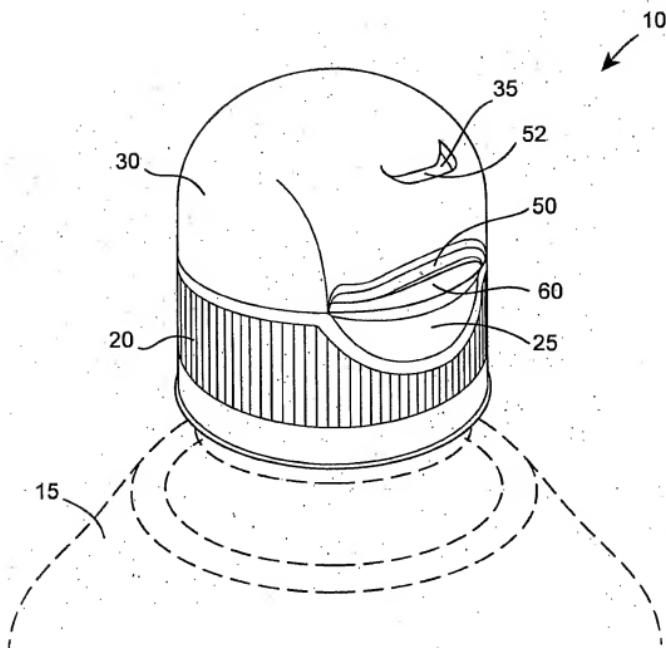


Fig. 2

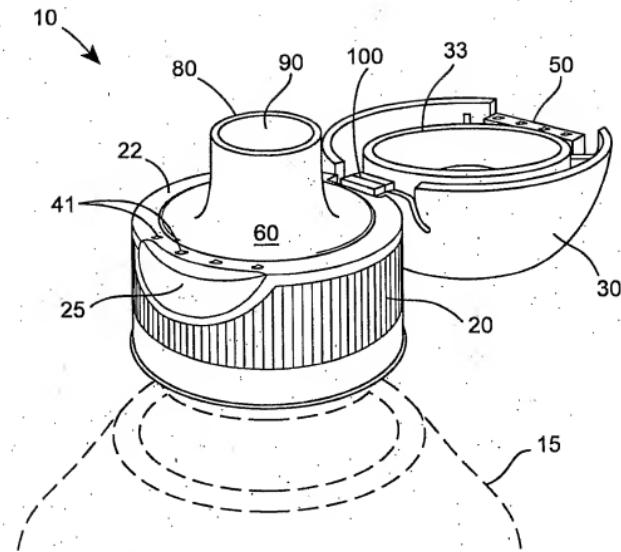


Fig. 3

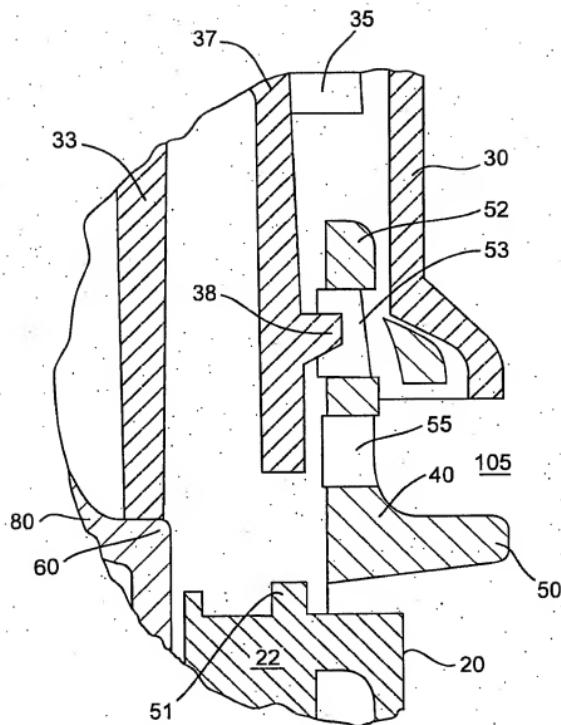


Fig. 4

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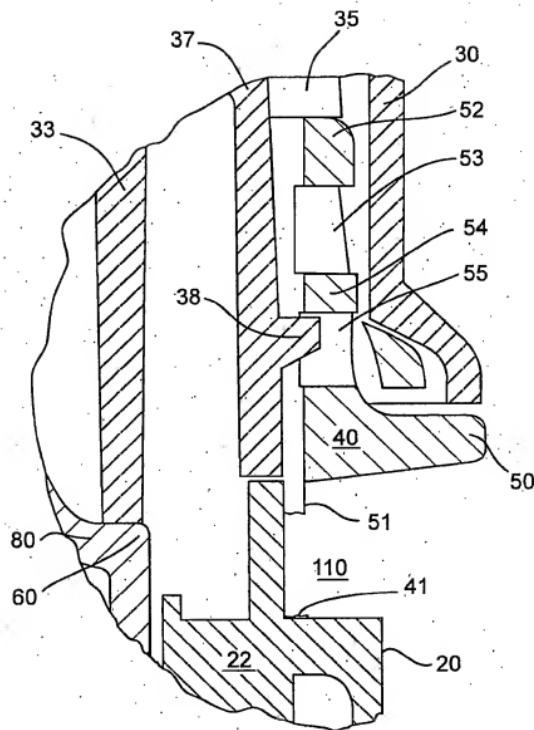


Fig. 5

A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	WO 00/66451 A (AUDUS NOBLE LTD [GB]; THOMPSON DAVID NOBLE [GB]; BUSHBY STEPHEN WILLIA) 9 November 2000 (2000-11-09) the whole document	1

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